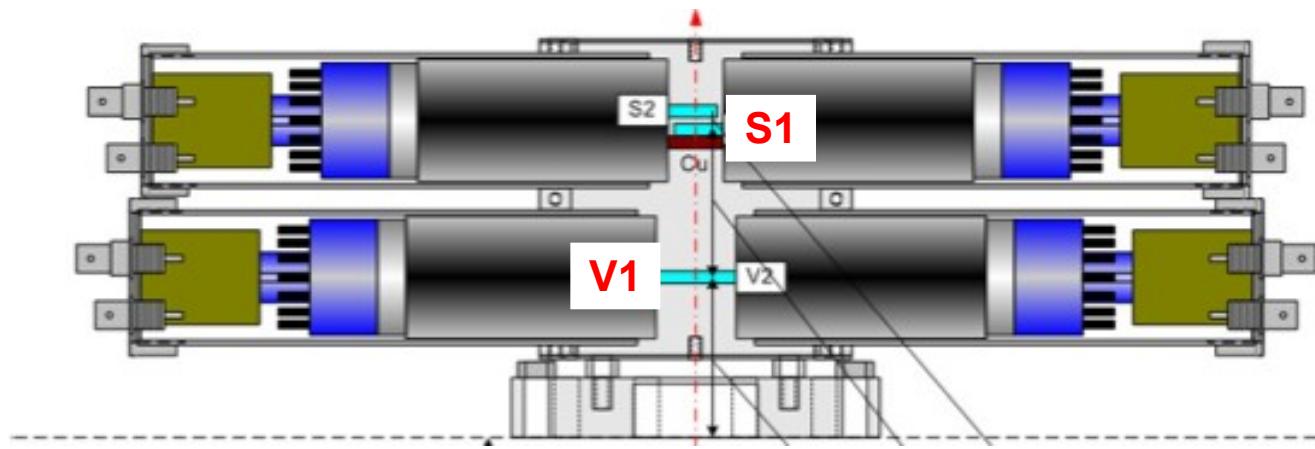


t_0 monitor scintillators: next look 31.03.11



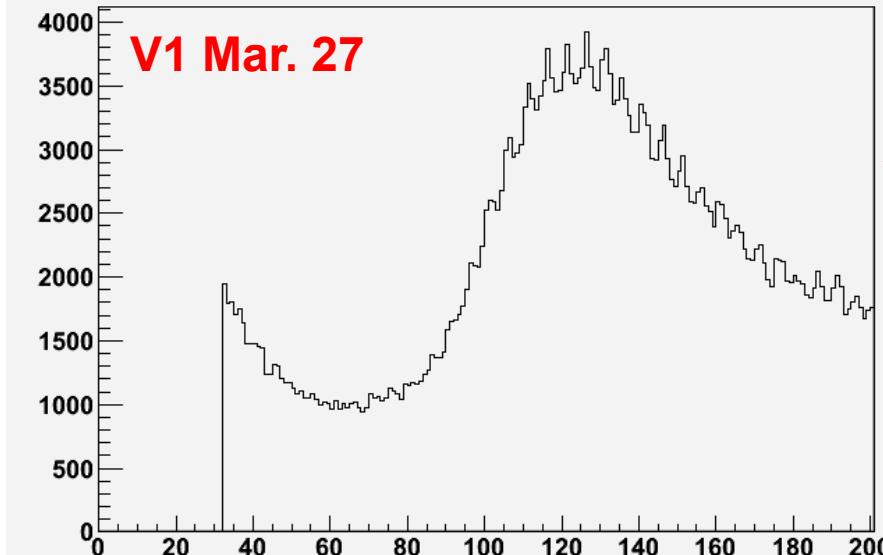
OPENING
DAY
2011



- V1,S1 HV on since 04.02.11
- Now looked at data from 14 normal target sweeps from 05.02.11 to 30.03.11, ~every 3-5 days
- Check stability:
 - p.h. amplitude
 - individual t_0 , $\sigma(t)$
 - relative t_0 S1-V1

Scint. pulse height: (in)stability

Hist of V1 amp

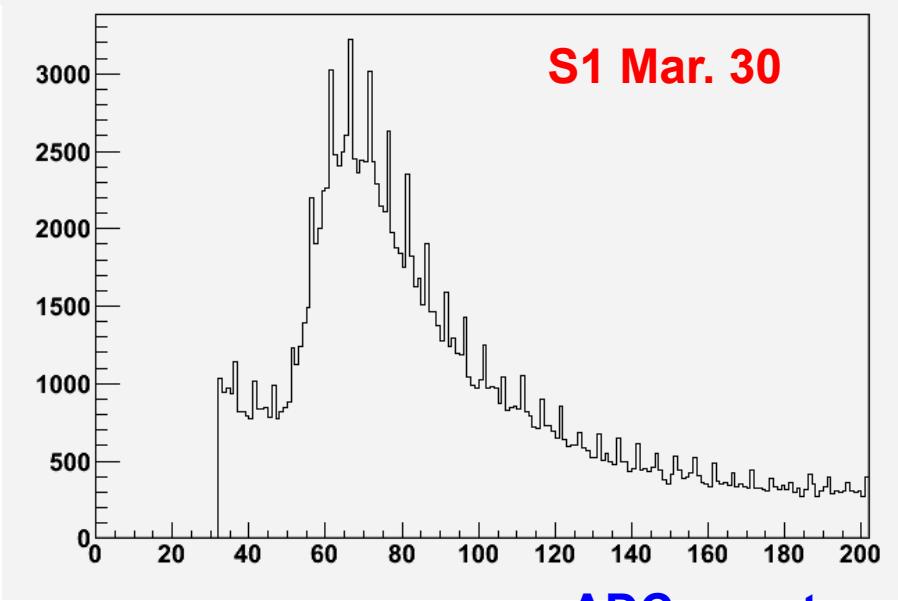
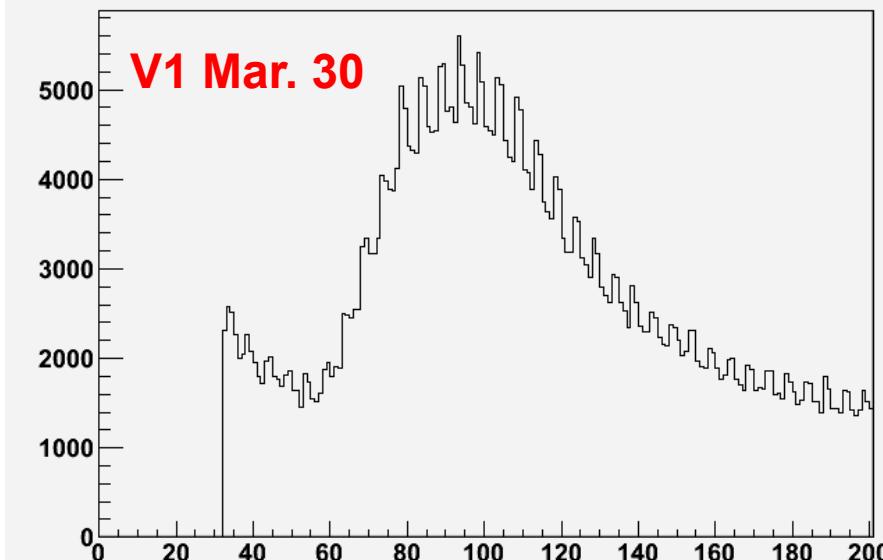


ADC saturation
peak cut out

Hist of S1 amp



Hist of V1 amp

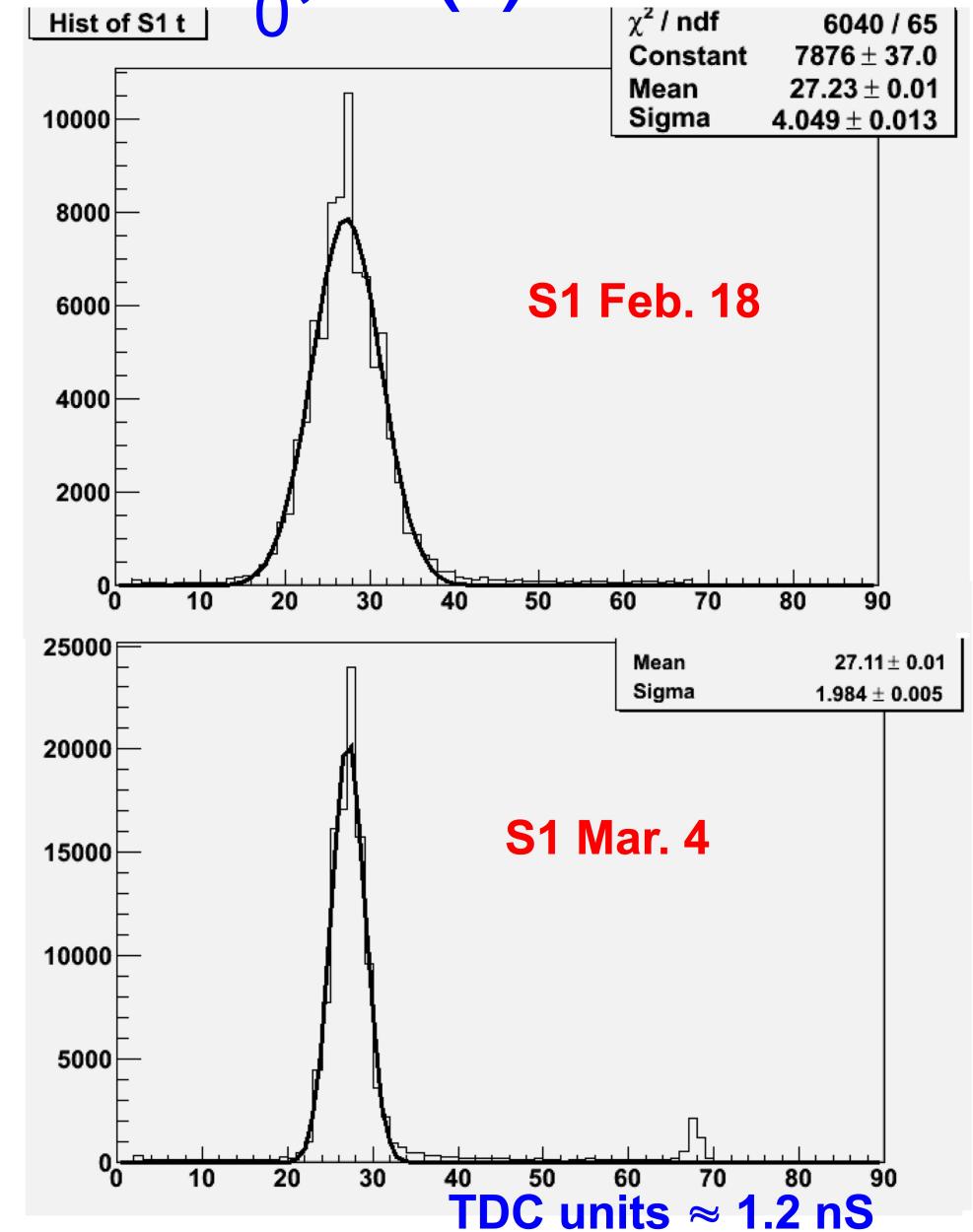
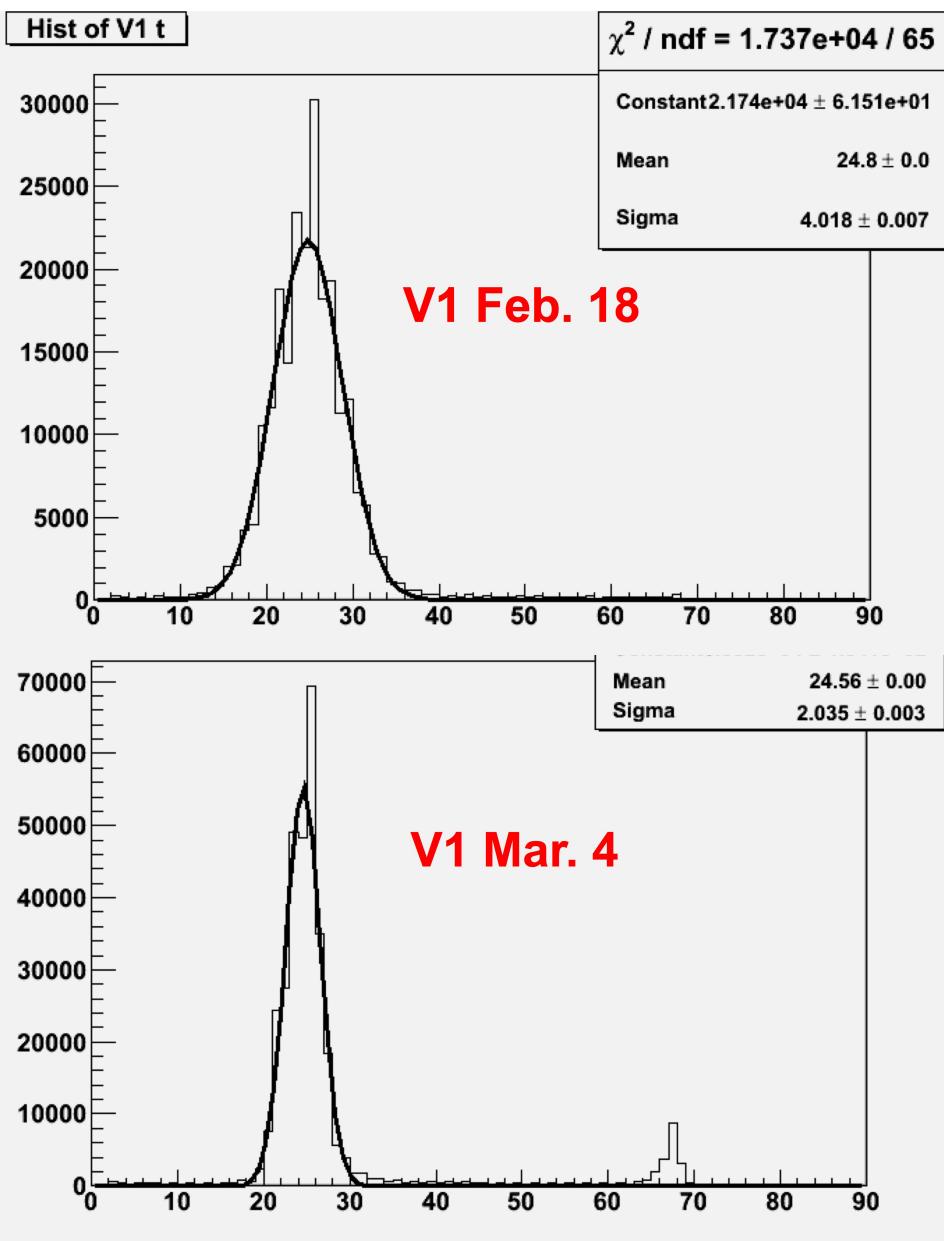


ADC counts

2

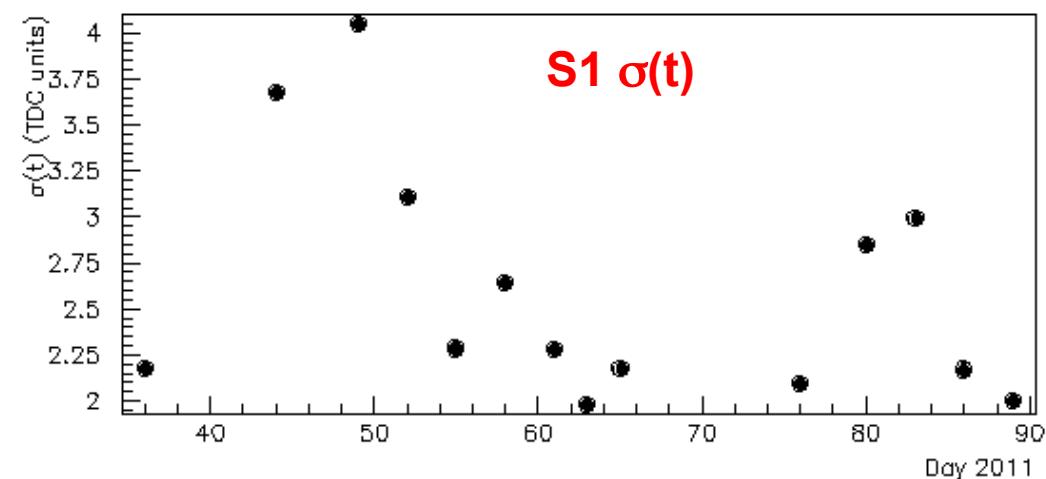
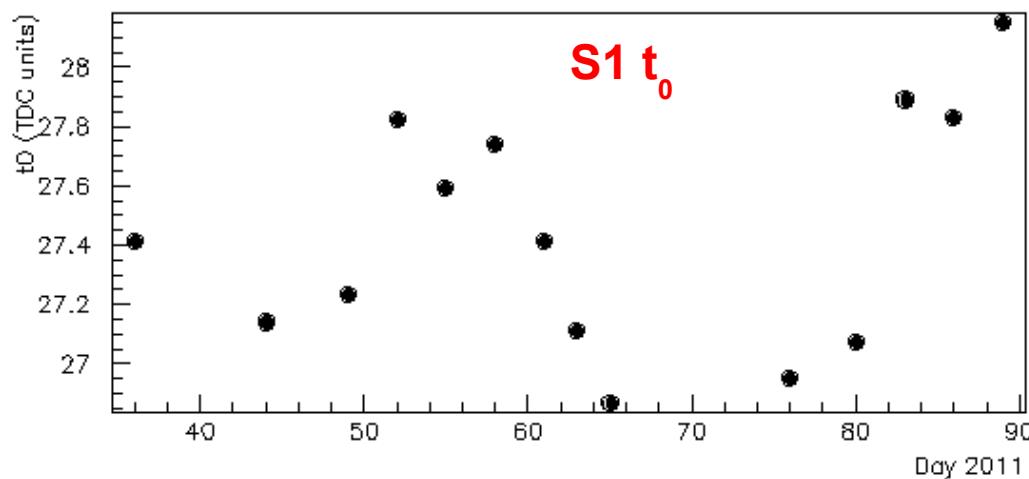
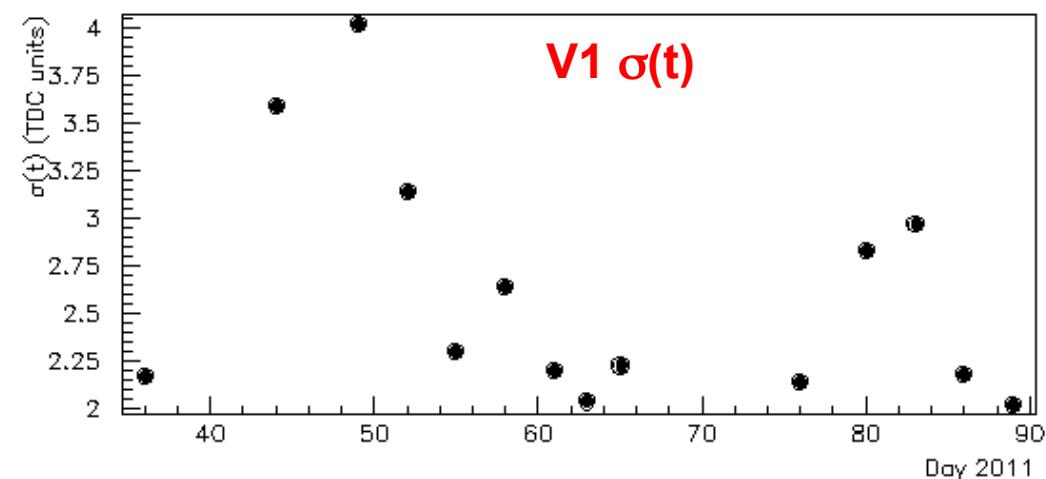
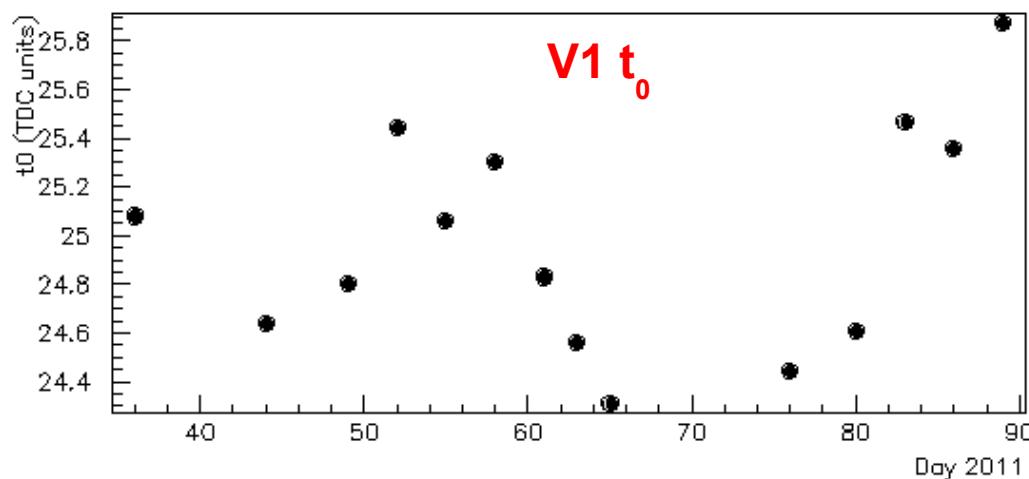
- Significant p.h. variation (3 days!); use ped.<ADC<saturation for t studies

Scint. time dist: t_0 , $\sigma(t)$ t_0 =mean Gaus. fit



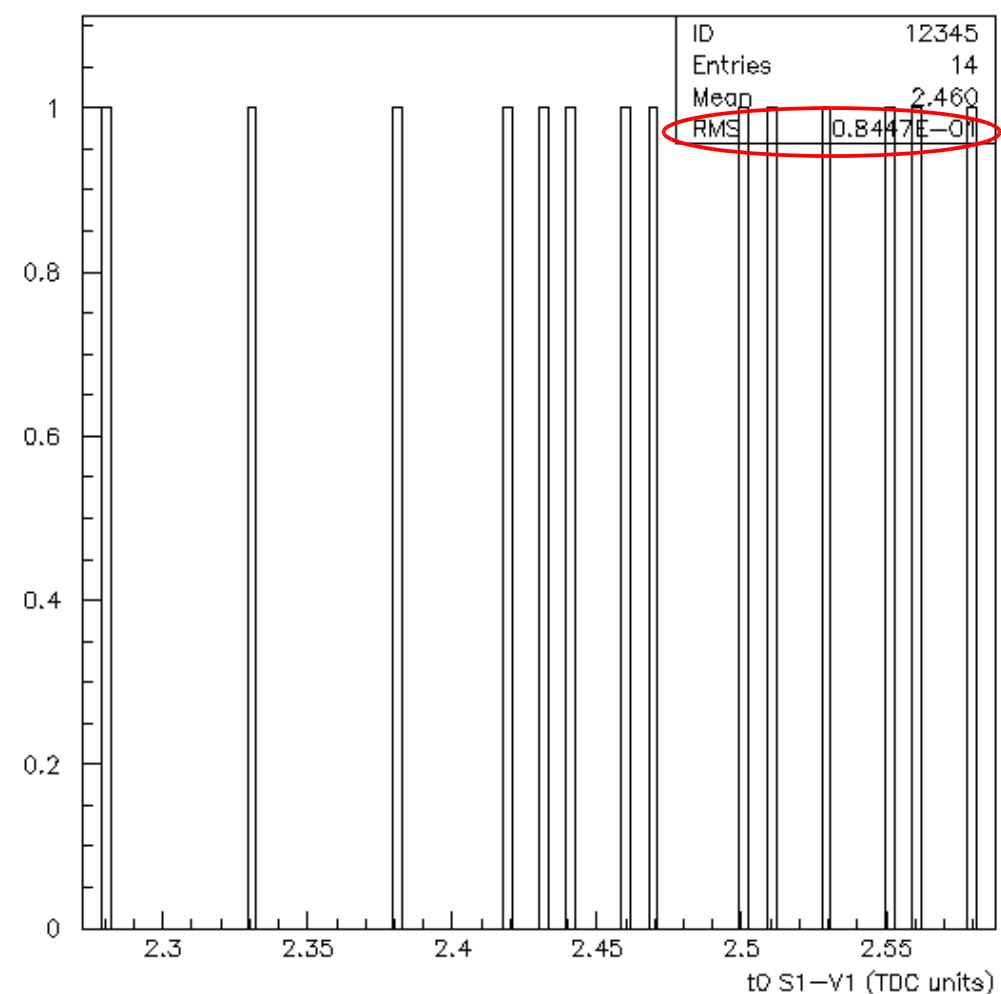
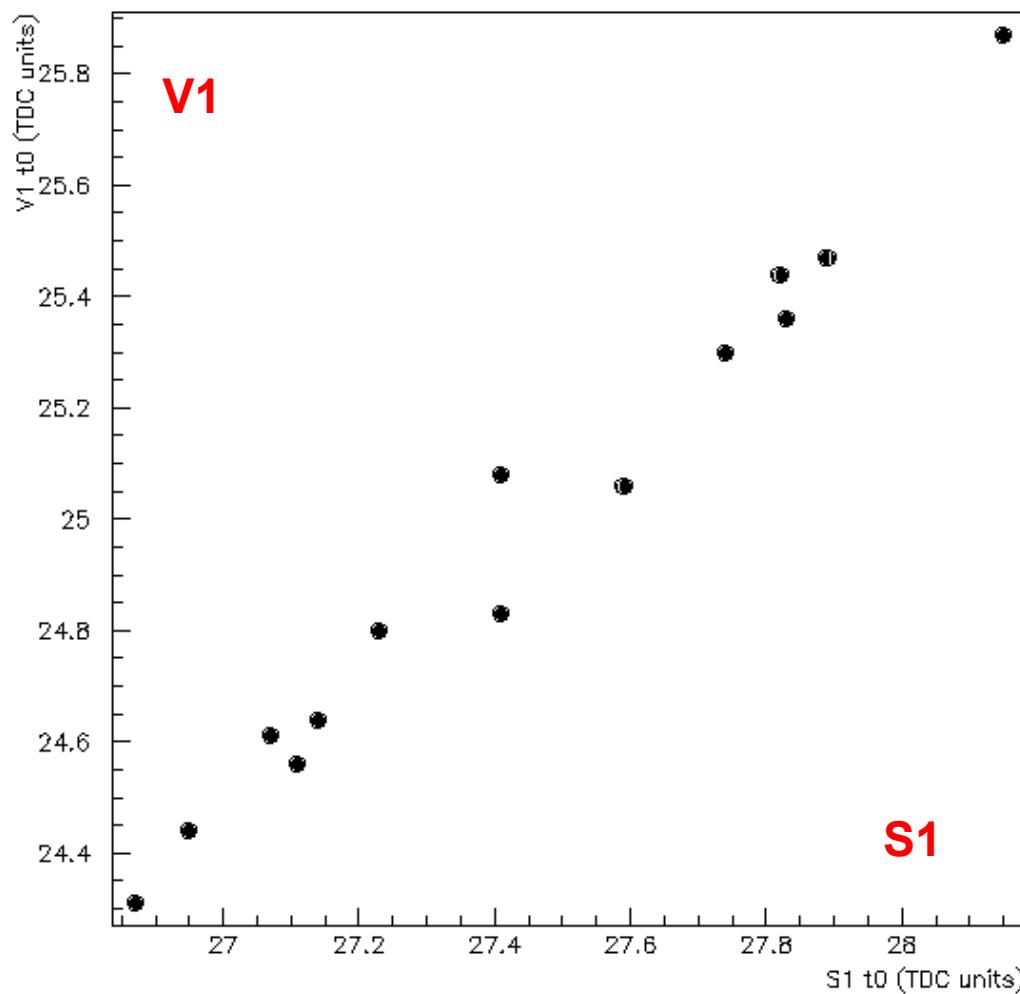
- t_0 largely stable; $\sigma(t)$ wide variation, 9Mhz RF operation?

Scint.: t_0 , $\sigma(t)$ evolution



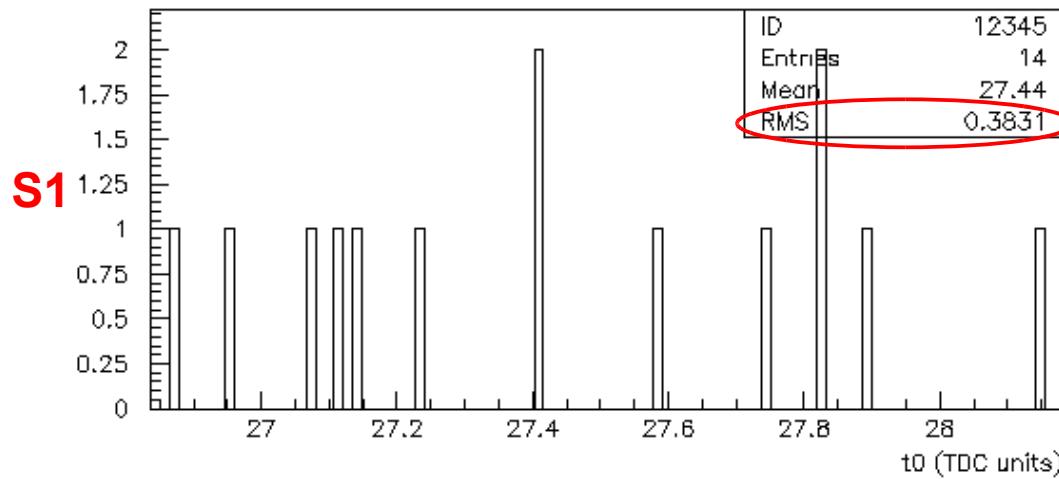
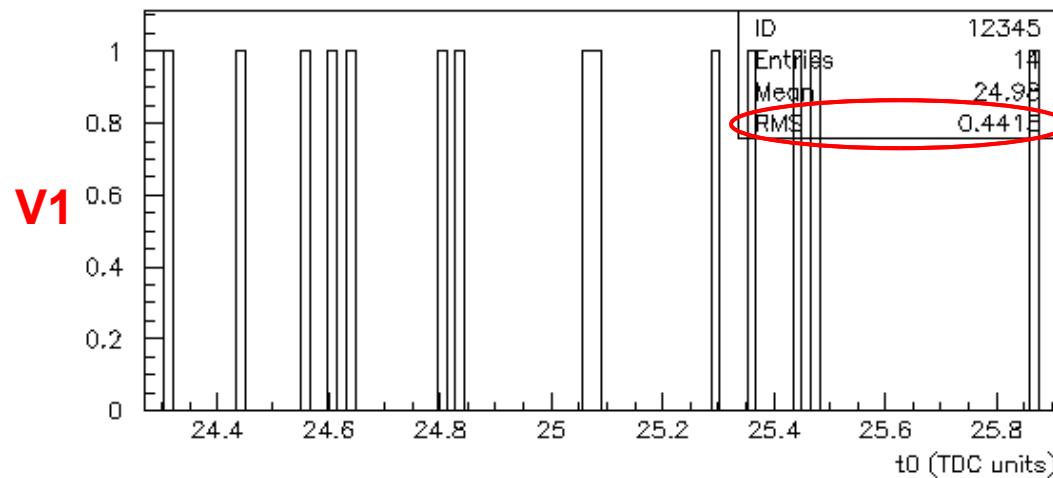
- V1,S1 t_0 's each vary over \sim nS range, track each other
- V1,S1 $\sigma(t)$'s each vary over factor of 2, track each other
9 MHz RF on/off?
- No clear $t_0 \leftrightarrow \sigma(t)$ correlation

Scint.: V1 \leftrightarrow S1 t_0 tracking



- V1,S1 t_0 's track each other very closely:
- RMS t_0 (S1-V1) ~ 0.1 nS, one measure of potential t resolution

Scint.: t_0 variance



- The RMS variation of the measured t_0 's is ~ 0.5 nS
- This is an upper limit on the stability of pC \rightarrow Si timing:
 - no correction for measured variation (may be possible)
 - no account for RMS from measurement method

Scint.: t_0 so far

Implications for polar. measurement stability

- Last December (mtg. 09.12.10, slides on wiki)
estimated t_0 stability effect on A_N
- With 0.5 nS in that result:
 $\sigma_{AN} / A_N = 1\% @ T=0.4 \text{ MeV}$
 $= 4\% @ T=0.9 \text{ MeV}$
uncert. over range $T=0.4-0.9 \text{ MeV}$ between 1-4%

Further studies:

- So far compared mean t_0 V1 \leftrightarrow S1;
do event-by-event V1 \leftrightarrow S1 correlations (root)
- Study t_0 variation within long fills
- Compare this t_0 to t_0 result from 'dead layer' fits
- More...

EXTRAS